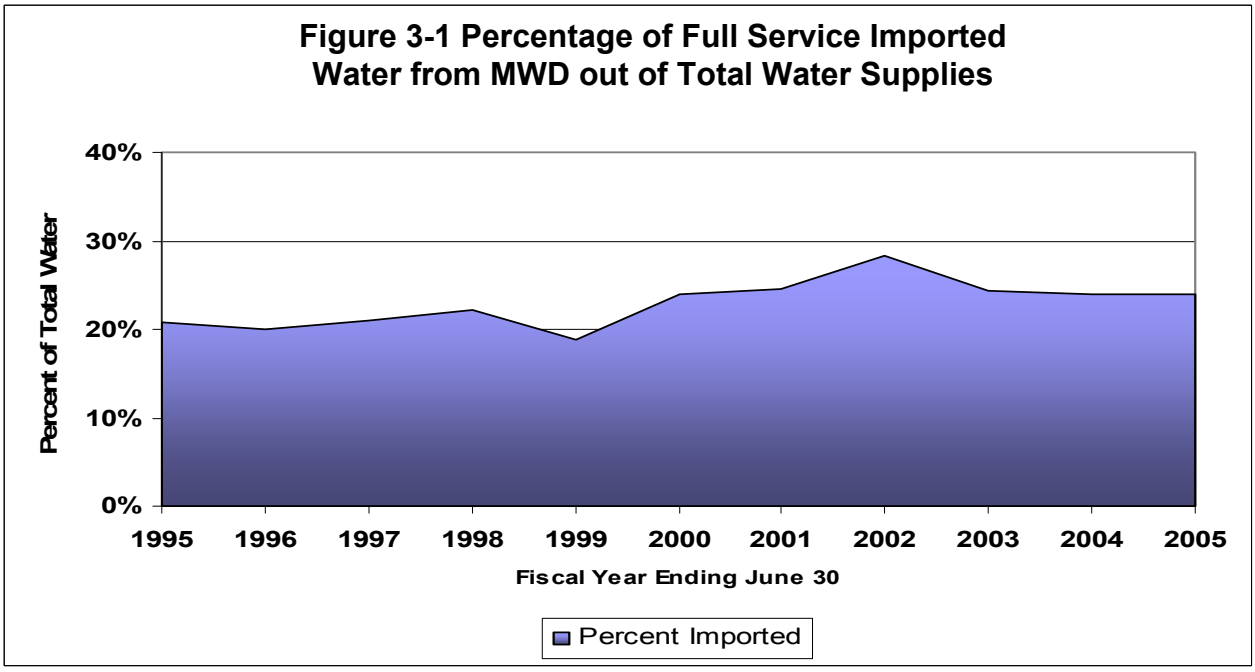
CHAPTER 3
WATER SUPPLIES

3.1 HISTORIC WATER SUPPLY TRENDS

The water used in IEUA's service area comes from both local and imported sources. Local sources include groundwater, surface water, desalinated water and recycled water. Imported water from northern California, delivered through the State Water Project[1], is purchased by IEUA from MWD for wholesale distribution to the retail agencies within IEUA's service area. Thus, a blend of ground, desalinated, surface, recycled and imported water is used to meet water demand.

When IEUA was formed in 1950, the water used within its service area was supplied exclusively from local groundwater and runoff from the San Gabriel Mountains. Over the next five decades, imported water deliveries steadily increased to help meet growing water demands within the area. By 1995, imported water supplied about 20% of the water demand in the service area, while local water sources supplied 80% of demand. During the past ten years, the percentage of imported full service water required to meet demand has increased to approximately 24% as shown in Figure 3-1. However, purchase of imported water was declined since 2002 reflecting the implementation of the regional integrated water strategy to maximize development of local supplies.

Figure 3-1 Percentage of Full Service Imported Water from MWD out of Total Water Supplies



[1] MWD distributes water from both the State Water Project and from the Colorado River to its' 26 member agencies. However, IEUA uses only State Water Project water due to salinity concerns within the Chino Basin. This is consistent with the basin plan and regulatory requirements of the Santa Ana Regional Water Quality Control Board.

IEUA, in partnership with the area's cities and retail agencies along with Chino Basin Watermaster, Santa Ana Watershed Project Authority, Orange County Water District, Metropolitan Water District of Southern California, Santa Ana Regional Water Quality Control Board, and other neighboring cities and agencies, have been working since 2000 on an integrated water management strategy. The goals of the integrated water management strategy are to develop additional local water supplies that will reduce the area's dependence on imported water, help to "drought proof" the local economy, and improve water quality within both the Agency's service area and the Santa Ana River watershed. The primary sources of new local water that are being developed include:

- The Chino Basin Desalter that provides advanced treatment of groundwater using volatile organic compound treatment, reverse osmosis and ion exchange (also see Appendix T);

- Inland Empire Utilities Agency Regional Recycled Water Program using recycled wastewater (Chapter 5); and

- Chino Basin Optimum Basin Management Program which recharges the groundwater basin using recycled water, stormwater and imported water (Chapter 6) to increase groundwater production for municipal users.

Between 2000 and 2005, implementation of these programs resulted in an average 11,700 acre-foot per year increase in new local water supplies. The expansion of the Chino Basin Desalter I and construction of Chino Basin Desalter II (completion in January 2006) will expand the treatment capacity from 9,000 AFY to 27,000 AFY.

3.2 PAST AND CURRENT LOCAL SUPPLIES

The history of water use by source within the IEUA Service Area for the past ten years is presented in Table 3-1. Total water use ranged from a low of 204,446 acre feet in fiscal year 1998 to a high of 266,751 acre feet in fiscal year 2004. The relative contribution of ground, surface, imported, recycled, and desalter water is shown in Figure 3-2.

Groundwater is the predominate source of water used in the service area, approximately 63 to 70 percent of the total water supplies for the IEUA service area. Imported water was the next largest category, ranging from 19 to 28 percent of the water used in the service area. Surface water from the San Gabriel Mountains comprise a fairly small portion of the water used in the service area ranging from 4 to 12 percent of the annual supplies depending on wet and dry winters. Recycled and desalter water combined for about 1 to 5 percent of the water use in the service area.

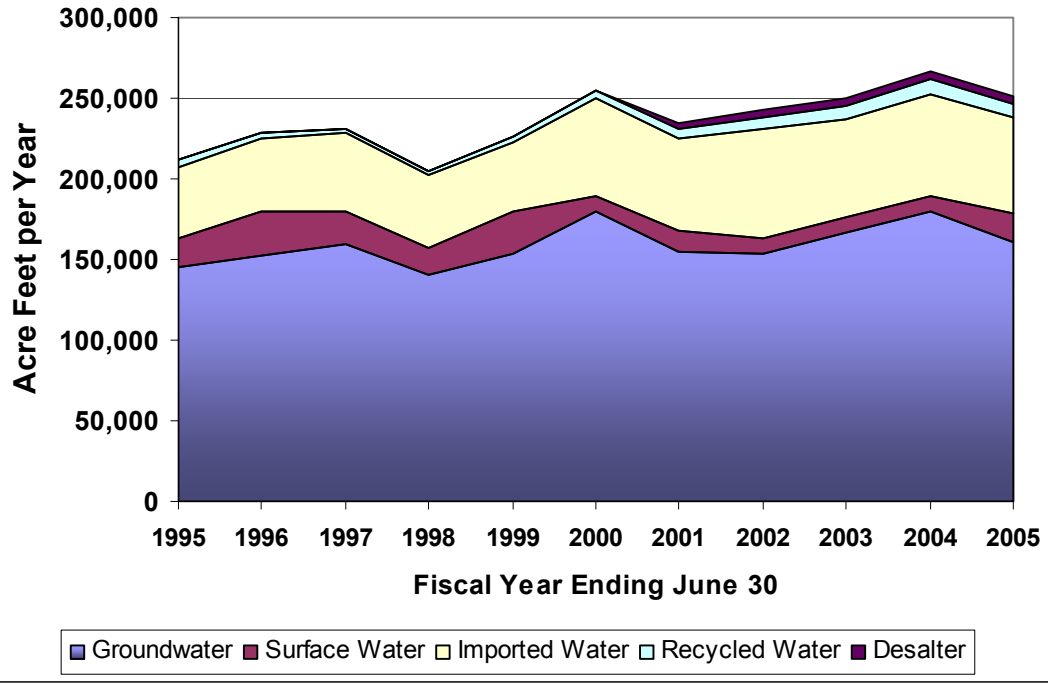
Table 3-1
Total Water Production by Source Within IEUA Service Area (AFY)

Water Source	Fiscal Year Ending June 30					
	1995	1996	1997	1998	1999	2000
Chino Basin Groundwater	68,216	70,501	79,459	71,459	77,828	89,879
Other Basin Groundwater	41,288	49,074	48,570	37,658	43,950	58,618
Surface Water	17,635	27,365	19,978	17,189	25,973	9,924
Imported Water	43,838	45,694	48,403	45,415	42,724	60,892
Recycled Water[a]	4,687	3,212	2,884	1,950	3,647	4,660
Desalter	0	0	0	0	0	0
Agricultural groundwater use	35,986	32,941	31,814	30,775	32,336	30,923
Total	**211,649**	**228,786**	**231,107**	**204,446**	**226,457**	**254,896**

Water Source	Fiscal Year Ending June 30				
	2001	2002	2003	2004	2005
Chino Basin Groundwater	80,871	85,806	92,501	89,615	92,411
Other Basin Groundwater	45,989	39,964	45,876	42,377	28,125
Surface Water	13,543	8,903	9,554	9,058	18,061
Imported Water	57,545	68,560	61,027	63,776	60,192
Recycled Water[a]	5,703	6,768	7,576	9,264	8,049
Desalter	3,213	4,519	4,778	4,696	3,904
Agricultural groundwater use	27,397	27,878	28,429	31,790	31,790
Total	**234,262**	**242,398**	**249,741**	**250,576**	**242,531**

[a]Recycled Water use by eight retail agencies and IEUA
Sources: Chino Basin Watermaster assessment table, WFA water Deliver, and retail agency records.

Figure 3-2. Total Water Supply within IEUA Service Area



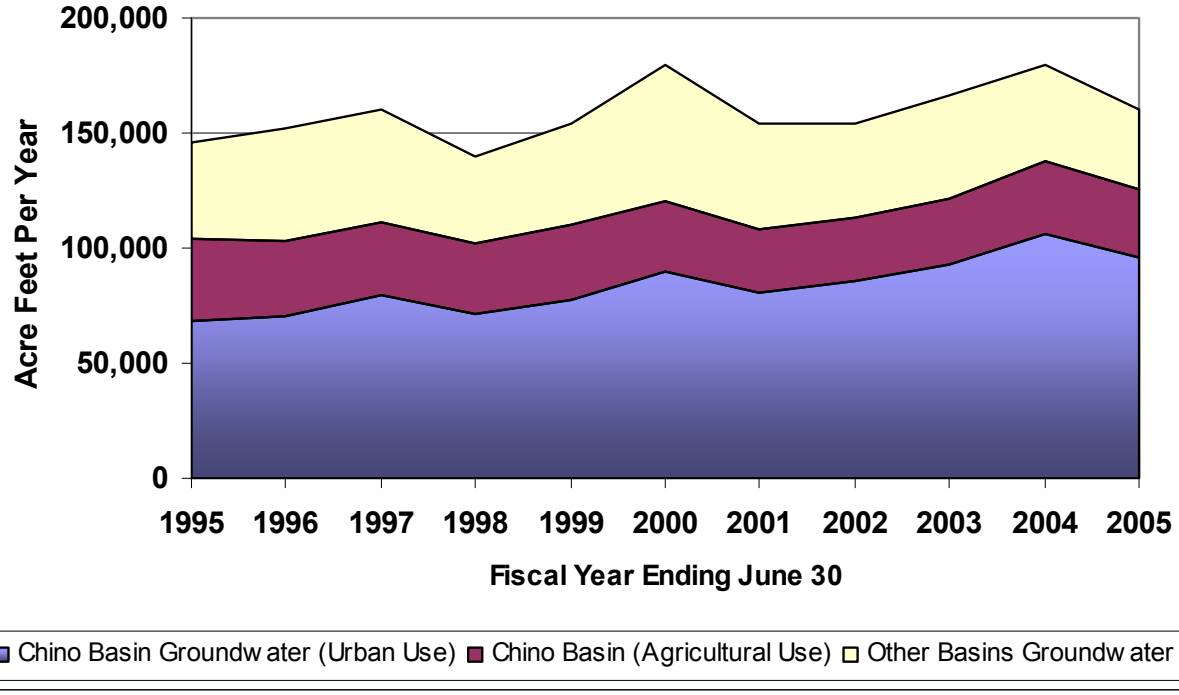
Groundwater supplies in the IEUA service area include:

1. Groundwater extracted from the Chino Groundwater Basin for municipal and industrial use, including recovered water by Chino Basin Desalter;
2. Groundwater extracted from the Chino Groundwater Basin for direct agricultural use via wells; and
3. Other groundwater basins (e.g. Cucamonga).

The volumes of each of these types of groundwater are shown in Figure 3-3. On average, about half (50%) of the groundwater used in the service area was from groundwater extracted from Chino Basin for municipal and industrial use. Agricultural use was about 22 percent of the groundwater used in the service area and 27 percent of the groundwater use in the service area was from groundwater basins other than the Chino Basin.

Water for conjunctive use and forbearance were received from MWD in the amount of 16,178 and 9,892 AF in 2004 and 2005, respectively. Imported water was reduced by this amount and Chino Basin Groundwater was increased by these amounts in 2004 and 2005.

Figure 3-3 Groundwater Use in IEUA Service Area



Chino Basin Groundwater

The Chino Groundwater Basin is the largest groundwater basin in the Upper Santa Ana Watershed. It currently contains approximately 5 million acre-feet of water in storage, with an additional unused storage capacity of about 1 million acre-feet.[2] IEUA's service area covers 70% of the Chino Groundwater Basin as shown in Figure 3-4.

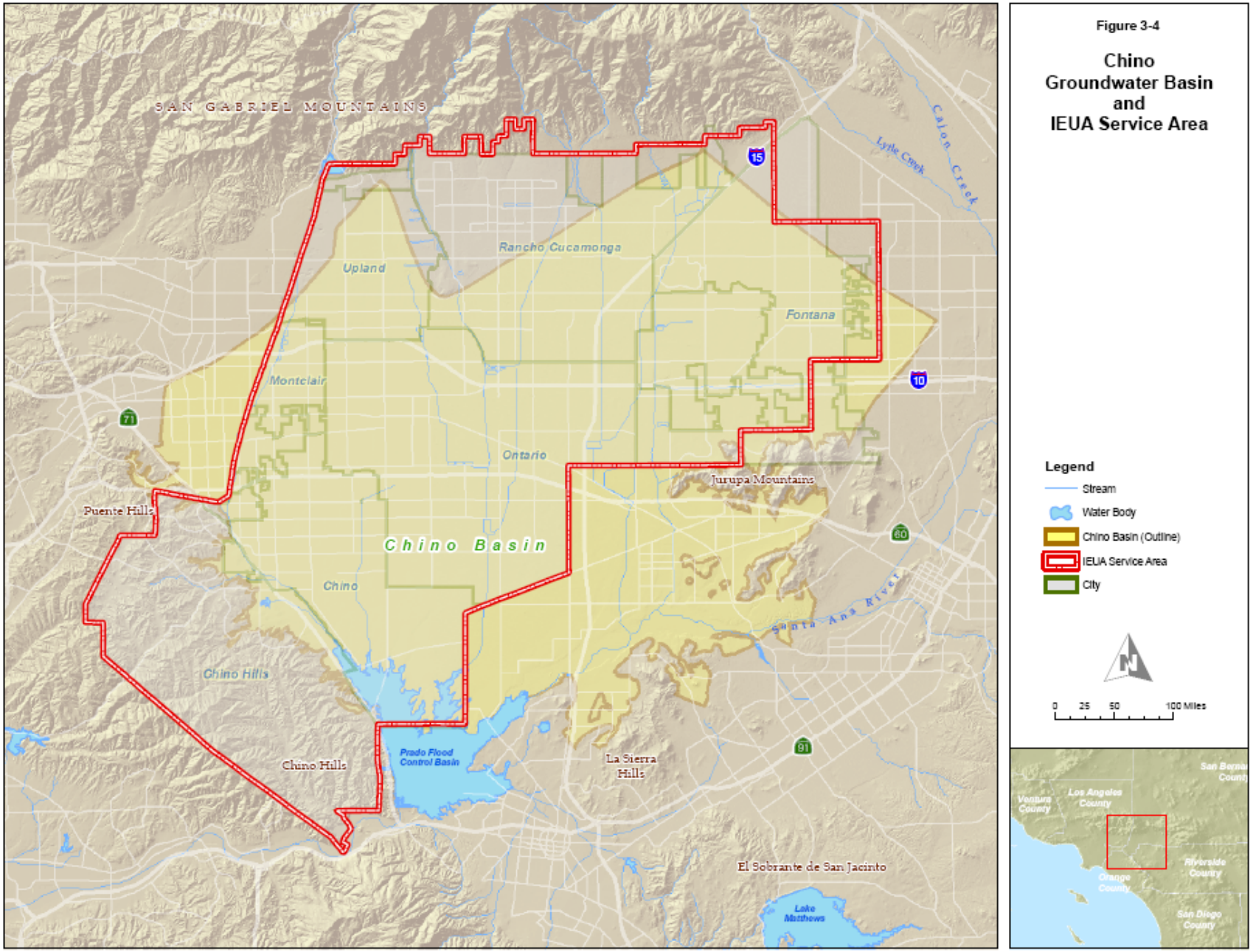
Water rights within the Chino Basin were adjudicated in 1978. The average safe-yield of the Basin is about 145,000 acre-feet per year. This water is allocated among three "pools" of users: the Overlying Agriculture Pool (82,800 acre-feet/year), the Overlying Non-Agricultural Pool (7,366 acre-feet/year) and the Appropriative Pool for urban uses (54,834 acre-feet/year). Additional groundwater production (in excess of the safe yield) is allowed by the adjudication provided that the pumped water is replaced with replenishment water.

Management of the Chino Groundwater Basin is guided by the 2000 "Peace Agreement" (see appendix W) of the Chino Basin Optimum Basin Management Program (OBMP, see Chapter 6). The Chino Basin Watermaster has held oversight responsibilities for the groundwater basin since its formation in 1978 with the adjudication of water rights.

Historically, Chino Basin Watermaster has purchased imported water from MWD (through IEUA) to provide replenishment water when pumping exceeds the safe yield of the basin. New sources of replenishment water now include local storm water and recycled water developed through the Chino Basin Groundwater Recharge Program (see Chapter 6). In addition, groundwater is re-allocated to the Appropriative Pool for urban use from the Overlying Agricultural Pool when it is not pumped by the agricultural users. Over time, as agricultural production declines within the IEUA service area, the reallocation of groundwater to the Appropriative Pool is expected to increase.

A market for the lease or sale of pumping rights within the Chino Basin is an important part of the management of this groundwater supply. Annual water exchanges occur regularly among agencies within IEUA's service area.

2 Estimate of unused storage capacity based upon historic water levels in the Chino Basin.


SAN GABRIEL MOUNTAINS
Lytle Creek
Cajon Creek
Rancho Cucamonga
Upland
Fontana
Montclair
Ontario
Jurupa Mountains
Puente Hills
Chino Basin
Chino
Santa Ana River
Chino Hills
Prado Flood Control Basin
La Sierra Hills
El Sobrante de San Jacinto
Lake Matthews
15
10
71
60
91
Figure 3-4
Chino Groundwater Basin and IEUA Service Area
Legend
Stream
Water Body
Chino Basin (Outline)
IEUA Service Area
City
N
0 25 50 100 Miles
Ventura County
Los Angeles County
San Bernardino County
Orange County
Riverside County
San Diego County

Groundwater quality in the lower Chino Basin is poor, as nitrates and Total Dissolved Solids (TDS) exceeding drinking water standards. Other water quality concerns include the presence of perchlorate, volatile organic chemicals and other contaminants in the Chino groundwater. Table 3-2 summarizes water quality analyses from water wells in the Chino Basin for the period of January 1999 through June 2004. Some of the contaminants are from natural sources (such as arsenic). Other contaminants were introduced by human activities, including weapons testing, the use and inappropriate disposal of solvents, and the application of fertilizer products. See Chapter 9 for more information on water quality.

Table 3-2
Summary of Water Quality Data for Groundwater from Chino Basin January 1999 through June 2004

Analyte Group / Constituent	Wells with Exceedances
Inorganic Constituents	
Nitrate	606
Total dissolved solids	479
perchlorate	128
Iron	75
Sulfate	69
Aluminum	57
Chloride	50
Managanese	40
Arsenic	12
Fluoride	11
General Physical	
Odor	14
Color	13
Chlorinated VOCs	
Trichloroethene (TCE)	101
1,2,3-trichloropropane	55
Tetrachloroethene (PCE)	30
1,1-dichloroethene	12
cis-1,2-dichloroethene	10
Radiological	
gross alpha	153
total radon	21

Source: Adapted from Chino Basin Watermaster, Optimum Basin Management Program, State of the Basin Report, July 2005

Under the OBMP, the Chino Basin Watermaster is working in partnership with the cities, retail agencies, private groundwater pumpers, IEUA and Santa Ana Regional Water Quality Control Board (SARWQCB) to address these water quality problems and increase the water supplies available from the groundwater basin. The construction and operation of facilities to desalt the brackish groundwater (Chino Desalter I and II) along with the installation of well head ion exchange treatment facilities are a critical part of this strategy. In 2005, the State Water Resources Control Board approved the Maximum Benefit Plan for the management of the Chino Basin which will allow recycled water to be used with storm water and imported water to recharge the upper portion of the groundwater basin while requiring the operation of the desalting facilities to pump and treat the generally lower quality water in the lower portion of the Chino Basin.

Groundwater production from the Chino Basin is shown in Table 3-3. Total groundwater production from the Chino Basin has increased from 140,000 acre-feet per year in 1991 to an estimated 180,000 acre-feet per year in 2004.

Table 3-3
Production of Chino Basin Groundwater (AFY) by Pool

Fiscal Year	Appropriative Pool	Overlying (Ag) Pool	Overlying (Non-Ag) Pool	Total
1975	70,312	96,567	8,878	**175,757**
1976	79,312	95,349	6,356	**181,017**
1977	72,707	91,450	9,198	**173,355**
1978	60,659	83,934	10,082	**154,675**
1979	60,597	73,688	7,127	**141,412**
1980	63,834	69,369	7,363	**140,566**
1981	70,726	68,040	5,650	**144,416**
1982	66,731	65,117	5,684	**137,532**
1983	63,481	56,759	2,395	**122,635**
1984	70,558	59,033	3,208	**132,799**
1985	76,912	55,543	2,415	**134,870**
1986	80,859	52,061	3,193	**136,113**
1987	84,662	59,847	2,559	**147,068**
1988	91,579	57,865	2,958	**152,402**
1989	93,617	46,762	3,619	**143,998**
1990	101,344	48,420	4,856	**154,620**
1991	86,658	48,085	5,407	**140,150**
1992	91,982	44,682	5,240	**141,904**
1993	86,367	44,092	5,464	**135,923**
1994	80,798	44,298	4,586	**129,682**
1995	93,419	55,022	4,327	**152,768**
1996	101,616	43,639	5,424	**150,679**
1997	110,163	44,809	6,309	**161,281**
1998	97,435	43,345	4,955	**145,735**
1999	107,723	47,538	7,006	**162,267**
2000	126,645	44,401	7,774	**178,820**
2001	113,437	39,954	8,084	**161,475**
2002	120,856	39,495	5,548	**165,899**
2003	121,587	37,457	4,823	**163,867**
2004	136,834	41,978	2,915	**181,727**

Source: Chino Basin Watermaster 27th annual report.

Chino Desalter Facilities

A second critical element to increasing Chino groundwater production is to reduce the salt imbalance within the basin. Consistent with the Optimum Basin Management Program (OBMP, 2000) and the Maximum Benefit Program (approved by the State Water Resources Control Board in 2005), desalting facilities must be constructed in the lower portion of the Chino Basin to remove salt and nitrates as well as to prevent poor quality water from the Chino groundwater basin from moving down the watershed into Orange County groundwater basins.

The Chino I Desalter was constructed in 2000 through a Joint Participation Agreement among five agencies: the Santa Ana Watershed Project Authority, Western Municipal Water District, Orange County Water District, Metropolitan Water District of Southern California and IEUA. Located in Chino, the facility currently produces 10,000 acre-feet per year of which approximately 9,000 acre-feet is used for potable purposes, serving an estimated 20,000 families within the cities of Chino and Chino Hills.

In 2002 the Chino Basin Desalter Authority, a Joint Powers Authority comprised of the cities of Chino, Chino Hills, Ontario, and Norco, the Jurupa Community Services District, and the Santa Ana River Water Company, was formed to manage the production, treatment and distribution of water produced by this facility (also see Appendix T). The Chino I Desalter is currently being expanded and is expected to produce between 14,000 and 15,900 acre-feet per year of water. This water will provide a supplemental supply to the cities of Chino, Chino Hills, and Ontario located within IEUA's service area as well as to the Jurupa Community Services District, City of Norco and the Santa Ana River Water Company located outside of IEUA's service area.

Other Groundwater

Local groundwater supplies from basins other than the Chino Groundwater Basin represent a significant supplemental source of water for the retail water agencies within IEUA's service area. These additional sources of supply include the Claremont Heights, Live Oak, Pomona, and Spadra Basins located in Los Angeles County; the Riverside South and Temescal Basins located in Riverside County; and the Colton-Rialto, Cucamonga, Lytle Creek, Bunker Hill, and Riverside North Basins located in San Bernardino County. The location of the other groundwater basins is shown on Figure 6-2 of Chapter 6.

IEUA's retail agencies that use groundwater from all or some of these basins include the City of Upland, Cucamonga Valley Water District, Fontana Water Company, and the San Antonio Water Company. Water from these basins also yield supplies for the City of Pomona, Southern California Water Company, West End Consolidated Water Company, Jurupa Community Services District, Western Municipal Water District, and West San Bernardino County Water District. The amounts of groundwater production used in the IEUA service area is presented in Table 3-4.

Table 3-4
Groundwater Supply from Other Basins Used Within IEUA Service Area (AFY)

Entity	Fiscal Year Ending June 30					
	1995	1996	1997	1998	1999	2000
City of Upland	10,383	13,036	14,705	11,478	14,071	17,406
Cucamonga Valley Water District	13,878	15,191	14,855	9,461	12,486	12,800
Fontana Water Company	14,276	14,536	16,104	15,062	14,566	18,985
San Antonio Water Company	2,751	6,311	2,906	1,658	2,827	9,428
Total Other Groundwater	**41,288**	**49,074**	**48,570**	**37,658**	**43,950**	**58,618**

Entity	Fiscal Year Ending June 30				
	2001	2002	2003	2004	2005
City of Upland	11,684	10,609	7,532	10,930	2,874
Cucamonga Valley Water District	8,200	7,461	7,191	5,468	8,351
Fontana Water Company	18,826	15,871	19,714	17,267	15,811
San Antonio Water Company	7,279	6,023	11,439	8,712	1,089
Total Other Groundwater	**45,989**	**39,964**	**45,876**	**42,377**	**28,125**

Source: Upland, CVWD and Fontana records.

Surface Water

Several of the retail agencies within IEUA's service area obtain a portion of their water supplies from local surface sources. These sources include San Antonio Canyon, Cucamonga Canyon, Day Creek, Deer Creek, Lytle Creek and several smaller surface streams. Production from surface supplies varies dramatically with year. During the past 10 years, surface water usage in the service area ranged from about 8,900 acre-feet per year in 2002 to 27,000 acre-feet per year in 1996 as presented in Table 3-5.

Table 3-5
Surface Water Supply Within IEUA Service Area (AFY)

Entity	Fiscal Year Ending June 30					
	1995	1996	1997	1998	1999	2000
City of Upland	3,345	3,334	2,353	1,257	4,115	346
Cucamonga Valley Water District	2,020	7,563	6,414	5,681	7,258	4,862
Fontana Water Company	9,936	13,084	8,835	6,418	11,487	4,180
San Antonio Water Company	2,334	3,384	2,375	3,832	3,113	536
Total Surface Water	**17,635**	**27,365**	**19,978**	**17,189**	**25,973**	**9,924**

Entity	Fiscal Year Ending June 30				
	2001	2002	2003	2004	2005
City of Upland	1,999	1,499	1,155	1,364	467
Cucamonga Valley Water District	4,770	3,361	3,550	1,785	5,087
Fontana Water Company	5,675	2,905	3,127	3,642	2,742
San Antonio Water Company	1,099	1,138	1,721	2,267	9,765
Total Surface Water	**13,543**	**8,903**	**9,554**	**9,058**	**18,061**

Source: Retail agency historical records.

Recycled Water

IEUA has produced and distributed high quality recycled water since 1972 when the Agency expanded its services to include regional wastewater treatment. Initially recycled water was delivered to a few large water users in the cities of Ontario and Chino. By the early 1990's, the Agency completed construction of the Carbon Canyon Recycled Water Plant which included distribution pipelines to serve additional customers in the cities of Chino and Chino Hills. In 1990, IEUA distributed 570 acre-feet of recycled water as a supplemental supply to these communities and this increased to about 9,000 acre-feet in 2004 as presented in Table 3-6 (see Chapter 5).

Currently, IEUA operates four regional recycled water plants that produce disinfected and filtered tertiary treated recycled water in compliance with California's Title 22 regulations. In aggregate, these facilities currently produce over 70,000 acre-feet of recycled water. IEUA completed the Inland Empire Utilities Agency Regional Recycled Water Implementation Plan in 2005 and is in the process of constructing Phase I of the recycled water distribution system. Current recycled water use is 8,000 acre-feet per year.

Table 3-6
Recycled Water Supply Within IEUA Service Area (AFY)

Entity	Fiscal Year Ending June 30					
	1995	1996	1997	1998	1999	2000
City of Chino					100	368
City of Chino Hills						129
City of Ontario	893	920	809	690	1,003	1,073
City of Upland						
Inland Empire Utilities Agency	3,794	2,292	2,075	1,260	2,544	3,090
Total Recycled Water	**4,687**	**3,212**	**2,884**	**1,950**	**3,647**	**4,660**

Entity	Fiscal Year Ending June 30				
	2001	2002	2003	2004	2005
City of Chino	293	368	958	1,544	830
City of Chino Hills	569	798	767	1,058	815
City of Ontario	1,001	1,232	1,197	1,160	1,169
City of Upland			88	0	0
Inland Empire Utilities Agency	3,840	4,370	4,567	5,502	5,235
Total Recycled Water	**5,703**	**6,768**	**7,576**	**9,264**	**8,049**

3.3 CURRENT IMPORTED WATER SOURCES

The Metropolitan Water District of Southern California (MWD) supplies imported State Water Project (SWP) water to IEUA for distribution throughout the agency's service area. MWD is a wholesale water agency that serves supplemental imported water from the SWP and the Colorado River Aqueduct (CRA) to 26 member agencies located within Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. Nearly 90% of the populations within these counties, about 18 million people reside within MWD's 5,200 square mile service area (see Figure 3-5).

MWD's Regional Urban Water Management Plan (draft 2005) provides a detailed description of its facilities and imported water supplies. MWD currently supplies an average of 50% of the total urban and agricultural water used within its boundaries. The remaining 50% comes from "local" sources provided by its member agencies, including groundwater, surface water, recycled water, and water from the City of Los Angeles' aqueduct located in the eastern Sierra [3]

Historic MWD deliveries to the IEUA service area are shown in Table 3-7. IEUA received its first delivery of imported water in 1954. Firm full service imported water purchased by IEUA has grown from 3,000 acre-feet in 1953 to an average of about 60,000 acre feet since 2000. IEUA also purchases MWD water supplies for agricultural users (about 200 AF per year) and groundwater storage in the Chino Basin.

[3]MWD includes the Los Angeles Aqueduct interbasin transfer under local supplies.

Figure 3-5 MWD Service Area Map

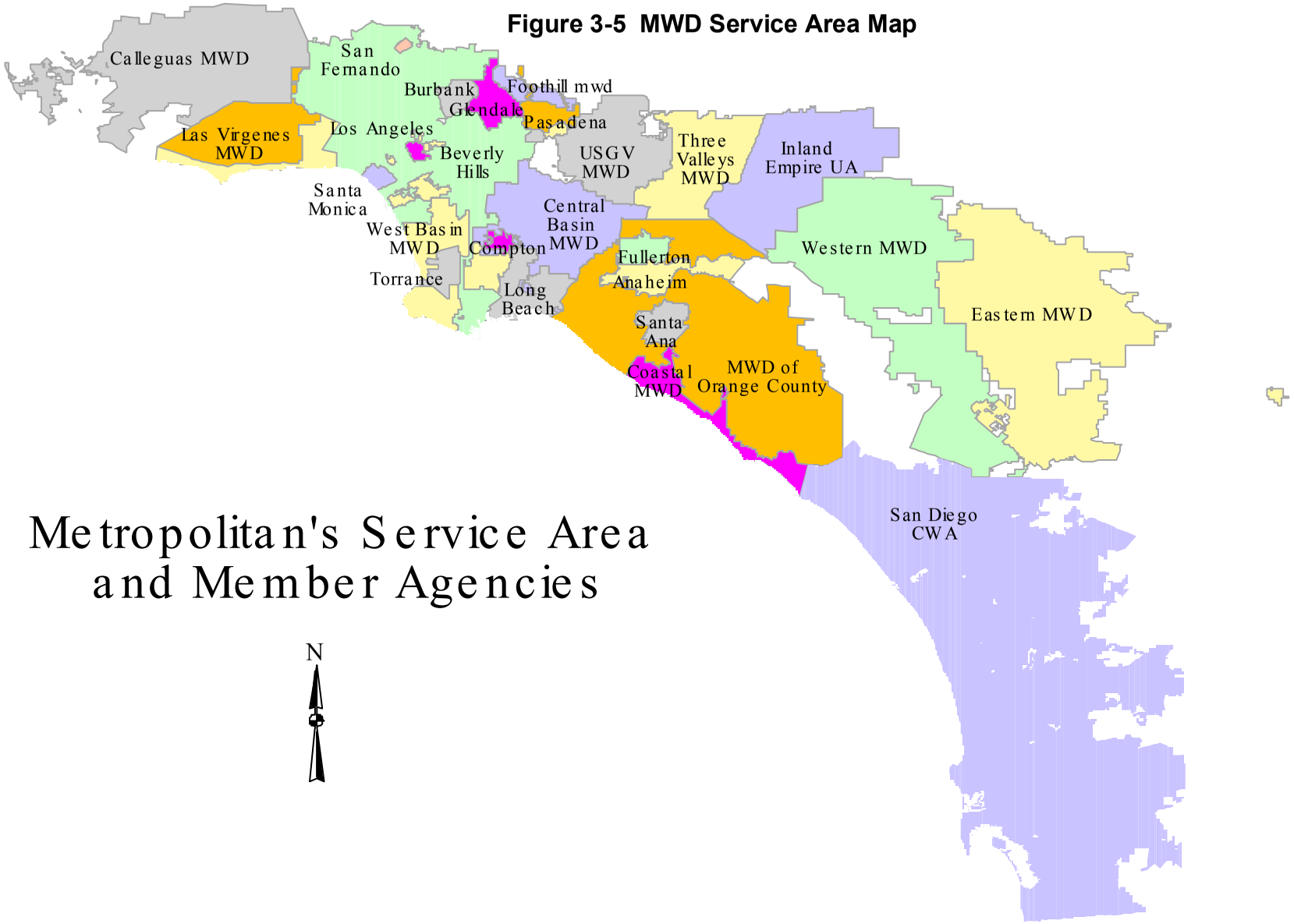


Table 3-7
MWD Historical Water Purchases by IEUA (AFY)

Fiscal Year	Full Service	Agricultural	Interruptible	Storage /1	**Total**
1954	3,135.0				**3,135.0**
1955	4,820.5				**4,820.5**
1956	5,033.3				**5,033.3**
1957	5,983.6				**5,983.6**
1958	6,850.3				**6,850.3**
1959	4,363.7	41.0			**4,404.7**
1960	3,568.1	83.0			**3,651.1**
1961	4,908.6	459.0			**5,367.6**
1962	6,416.4	796.0			**7,212.4**
1963	6,865.2	1,195.0			**8,060.2**
1964	14,598.7	1,579.0			**16,177.7**
1965	18,993.5	2,699.0			**21,692.5**
1966	13,422.2	2,154.0			**15,576.2**
1967	10,071.7	1,072.0			**11,143.7**
1968	10,883.8	1,681.0			**12,564.8**
1969	8,565.2	134.0			**8,699.2**
1970	7,262.5	370.0			**7,632.5**
1971	8,583.8	462.0			**9,045.8**
1972	9,611.7	660.0			**10,271.7**
1973	8,592.6	634.0			**9,226.6**
1974	8,427.7	800.0			**9,227.7**
1975	8,841.0	933.0			**9,774.0**
1976	9,474.0	1,842.0			**11,316.0**
1977	11,096.0	1,698.0			**12,794.0**
1978	20,357.0	924.0			**21,281.0**
1979	10,361.6	817.3	16,088.6		**27,267.5**
1980	11,196.0	69.4	7,841.4	10,677.6	**29,784.4**
1981	13,163.1	335.6	17,861.9	3,020.6	**34,381.2**
1982	7,837.4	588.1	25,914.6	2,453.7	**36,793.8**
1983	4,792.3	303.4	21,797.5		**26,893.2**
1984	4,727.6	404.2	21,230.0		**26,361.8**
1985	8,201.0	558.6	21,001.6		**29,761.2**
1986	9,150.3	398.4	24,701.0	1,072.5	**35,322.2**
1987	11,673.6	368.7	18,393.2	3,522.6	**33,958.1**
1988	9,728.8	459.0	12,245.1	13,142.2	**35,575.1**
1989	20,247.2	175.3	25,931.5		**46,354.0**
1990	15,773.0	117.8	26,156.5	26,616.5	**68,663.8**
1991	20,015.9	26.2	28,071.0	4,011.7	**52,124.8**
1992	31,924.5	152.0		75,976.1	**108,052.6**
1993	29,407.0	94.4		51,553.7	**81,055.1**
1994	28,897.1			28,046.9	**56,944.0**
1995	36,967.8	8.5		1,579.5	**38,555.8**
1996	35,204.1	77.4		4,408.8	**39,690.3**
1997	44,728.2	118.8		5,058.7	**49,905.7**
1998	39,320.6	83.8		11,895.1	**51,299.5**
1999	41,607.8	68.1		8,414.1	**50,090.0**
2000	57,070.3	104.1		5,332.1	**62,506.5**
2001	57,735.6	45.1		11,742.5	**69,523.2**
2002	64,996.0	44.0		9,006.3	**74,046.3**
2003	57,415.5	52.3		13,449.9	**70,917.7**
2004	64,024.7	49.3		7,582.0	**71,656.0**
2005	54,859.0	38.9	8,931.7	42,259.4	**106,089.0**

Source: Chino Basin Watermaster 27th annual report.

3.4 FUTURE WATER SUPPLY STRATEGY FOR IEUA's SERVICE AREA

The goal of the IEUA UWMP is to maximize local water sources and minimize the need for imported water, especially during dry years and other emergency shortages from MWD. The integrated plan strives to achieve multiple objectives of increased water supply, enhanced water quality, improved quality of life, and energy savings.

Throughout the rest of this chapter, agricultural uses are not included in the discussion of future urban water supplies. Water for agricultural use is generally supplied by privately-owned groundwater wells (or in some cases recycled water). The adjudicated agricultural groundwater pool is more than enough to supply future agricultural demand for water. Future agricultural demand will decrease with time as agricultural land use areas are converted to urban land uses. Therefore, the analysis of future water uses focuses on urban water uses. A projected water supply from each of the retail agencies was collected from member agencies UWMP. Water supply projections throughout the rest of this chapter are primarily based on these data, IEUA recycled water availability information and CDA groundwater recovery production information.

Table 3-8 summarizes the projected urban water supply by source within IEUA's service area. Urban water use within the service area is projected to grow from 220,100 AFY[4] in 2005 to 383,100 AFY in 2025. Imported water from MWD will decrease from 27 % in 2005 to 22% in 2025 of the water supplies. Figure 3-6 shows the projected imported water supply by agency. Recovered groundwater from the desalters and recycled wastewater make up a significant portion (about 83,200 AFY) of the water supply in the year 2025, while the remainder of the growth in water supply comes primarily from groundwater in Chino Basin and imported water.

Table 3-8
Projected Urban Water Supply In IEUA Service Area By Source (AFY)

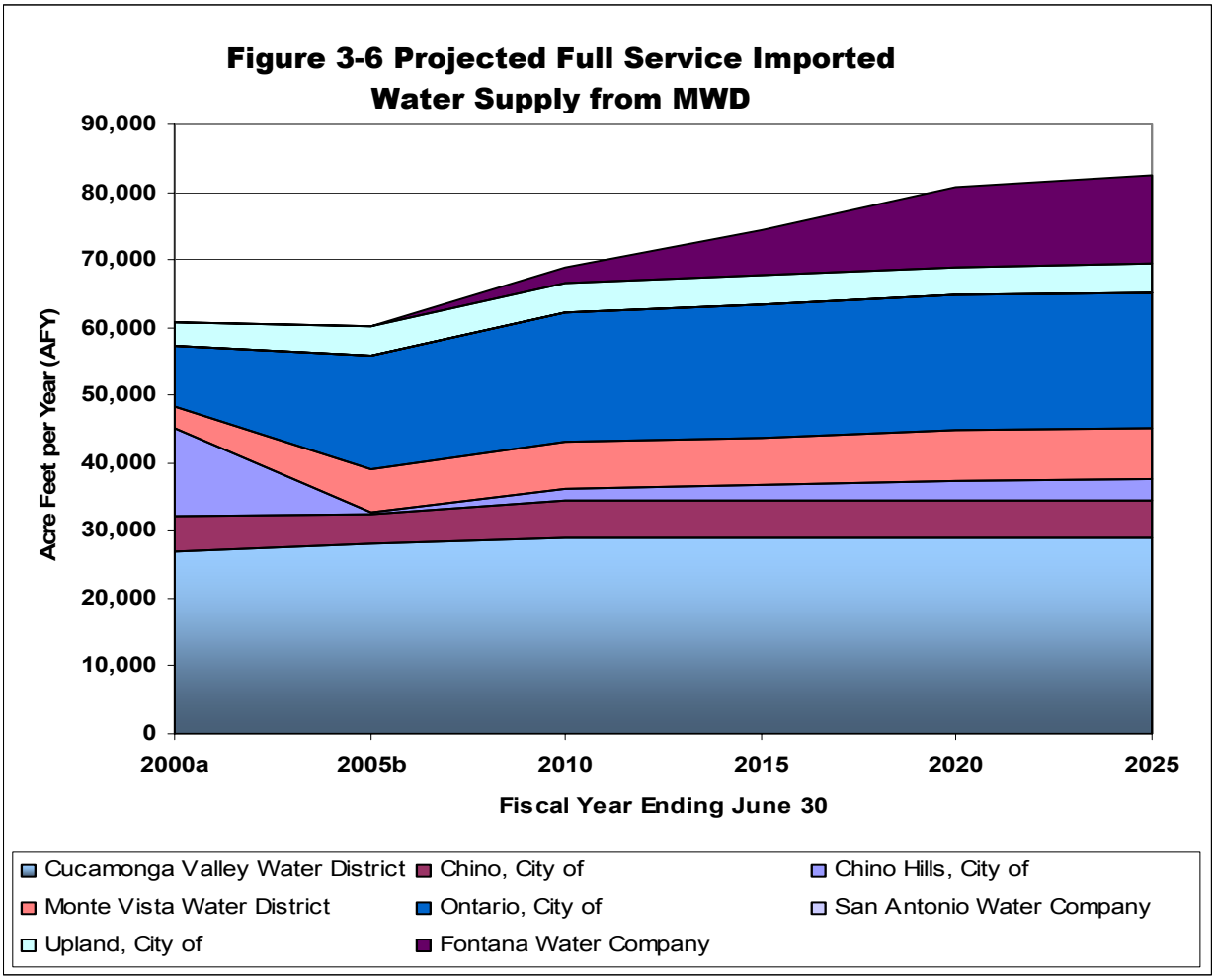
	Fiscal Year Ending June 30					
Source of Water Use	**2000[a]**	**2005[b]**	**2010**	**2015**	**2020**	**2025**
Chino Basin Groundwater	89,900	94,600	130,900	143,700	157,800	165,000
CDA Supply (Chino Basin GW)	0	6,250	14,200	14,200	14,200	14,200
Other Basin Groundwater	58,618	32,800	32,800	33,600	33,700	33,700
Imported Water (Metropolitan)	60,892	60,200	68,800	74,300	80,600	82,500
Recycled Water	4,700	7,530	39,000	49,000	58,000	69,000
Local Surface Water	9,924	18,700	18,700	18,700	18,700	18,700
Total	**224,000**	**220,100**	**304,400**	**333,500**	**363,000**	**383,100**

[a] Actual Values [b]Estimated Values based on Wet Year [c]Rounded to nearest hundred

Significant investment in facilities is required in order to achieve the reduced dependence on imported water and to achieve the other program goals. These include capital expenditures of about $110 million dollars for recycled water projects over the next 10 years, $50 million dollars for construction of recharge basins, $ 150 million for

[4] Values in Tables 3-8 through 3-15 are estimates of available supplies from the eight member agencies in their respective UWMP. Therefore, values for 2005 will not necessarily match values for 2005 in Table 3-1 and Tables 3-4 through 3-6.

Desalters I and II, and $ 27.5 million for the MWD recharge and extraction of stored imported water for the Dry Year Yield Program. Together, almost $350 million is being spent to enhance local water supplies.



3.5 FUTURE LOCAL WATER SUPPLIES

In order to reduce the amount of full service imported water used in the future in this rapidly growing area, the use of future local water supplies will need to increase dramatically, particularly the use of groundwater, recycled water and recovered groundwater from the Chino Desalters. Surface water use will continue at existing levels.

Groundwater

Increased groundwater pumping from the Chino Groundwater Basin, particularly during dry years, is a critical element of the integrated water management strategy for meeting future water needs within IEUA's service area. The water extracted in excess of the annual safe yield, will be replenished from a mix of stormwater, recycled water and imported water during wet year periods.

Chino Basin groundwater supplies will be significantly enhanced over the next twenty years through the implementation of conjunctive management and groundwater quality improvement programs identified in the Optimum Basin Management Program (OBMP, see Chapter 6) and coordinated with the Chino Basin Watermaster. These include expansion of the Chino Basin Groundwater Recharge Program which will substantially increase the replenishment of the groundwater basin through a combination of storm water, recycled water and imported water (designed to maximize the use of interruptible supplies when available). Groundwater treatment facilities (well head ion exchange) are being constructed through the Dry Year Yield (Conjunctive Use) Program to facilitate recovery of the stored water during dry years. Over the next twenty years, there is the potential to increase the safe storage capacity of the Chino Groundwater Basin by 500,000 acre-feet.

As a result of these programs, groundwater supplies used to meet future water needs within IEUA's service are expected to increase by about 70,000 acre-feet over the next twenty years (from about 94,600 acre-feet in 2005 to 165,000 acre feet in 2025 (Table 3-9).

Table 3-9
Projected Chino Basin Groundwater Production for Urban Use in IEUA Service Area (AFY)

Agency	Fiscal Year Ending June 30					
	2000[a]	2005[b]	2010	2015	2020	2025
Chino, City of	10,201	6,300	8,900	12,100	13,200	13,200
Chino Hills, City of	4,264	4,000	4,200	4,200	4,200	4,200
Cucamonga Valley Water District	7,250	13,800	28,000	34,000	37,000	37,000
Fontana Water Company	21,152	24,500	25,000	25,000	25,000	25,000
Monte Vista Water District	8,626	16,500	30,100	30,100	33,000	33,000
Ontario, City of	36,523	23,513	28,570	32,179	39,208	46,254
San Antonio Water Company	294	1,300	1,400	1,400	1,500	1,600
Upland, City of	1,570	4,700	4,700	4,700	4,700	4,700
Total [c]	**89,900**	**94,600**	**130,900**	**143,700**	**157,800**	**165,000**

[a] Actual Values [b]Estimated Values based on Wet Year [c]Rounded to nearest hundred
Source: Retail Agency UWMPs

Chino Desalter Facilities

The area's ability to significantly increase future groundwater production from the Chino Groundwater Basin is directly linked to construction and operation of additional desalting capacity in the southern portion of the Basin. These desalter facilities will provide hydraulic control in the lower portion of the Chino Basin, ensuring that poor quality groundwater from this area does not migrate out of the Chino Basin and contaminate groundwater basins in Orange County. In addition, the desalters produce new reliable, high quality water supplies of 14,200 AFY (See Table 3-10) to meet the water demands within IEUA's service area as well as 10,400 AFY in the adjacent communities served by the City of Norco, Santa Ana River Water Company and the Jurupa Community Services District.

Table 3-10
Projected Chino Basin Desalter Water for Urban Supply (AFY)

Agency	Contracted Volume	Fiscal Year Ending June 30				
		2005[b]	2010	2015	2020	2025
City of Chino	5,000	5,000	5,000	5,000	5,000	5,000
City of Chino Hills	4,200	1,250	4,200	4,200	4,200	4,200
City of Ontario	5,000	0	5,000	5,000	5,000	5,000
Subtotal for IEUA	**14,200**	**6,250**	**14,200**	**14,200**	**14,200**	**14,200**
Jurupa Community Services District	8,200	8,200	8,200	10,700	10,700	10,700
Santa Ana River Water Company	1,200	0	1,200	1,200	1,200	1,200
City of Norco	1,000	0	1,000	1,000	1,000	1,000
Subtotal for WMWD	**10,400**	**8,200**	**10,400**	**12,900**	**12,900**	**12,900**
Total [c]	**24,600**	**14,500**	**24,600**	**27,100**	**27,100**	**27,100**

[b]Chino Desalter 2 to begin operation at end of 2005

[c]Rounded to nearest hundred

Under the Optimum Basin Management Plan, approximately 40,000 acre-feet of desalter treatment capacity is proposed to be constructed. The desalters will use a combination of reverse osmosis and ion exchange technology to treat the pumped groundwater. The concentrated brine from the desalter operations will be delivered to the Santa Ana Regional Interceptor (SARI) brine line and conveyed to the Orange County Sanitation District for treatment and ultimate disposal in the Pacific Ocean.

The Desalter program is currently administered through the Chino Basin Desalter Authority (CDA), a joint powers authority among the Cities of Chino, Chino Hills and Ontario (within IEUA's service area) and the City of Norco, Santa Ana River Water Company and Jurupa Community Services District in the adjacent Western Municipal Water District.

Currently Desalter I is online, producing about 9,000 acre-feet per year of potable water. This project is being expanded and is expected to produce between 14,000 and 15,900 acre-feet per year of potable supplies. In addition, a second facility, Desalter II, is under construction, and is expected to produce an additional 10,000 acre-feet of new water supplies by the end of 2005. A third Desalter with 16,000 acre-feet of treatment capacity is being discussed and represents a potential alternative supply in ten to fifteen years (see Chapter 7).

As a result of these programs, the portion of the desalter water supplies used to meet future water needs within IEUA's service are projected to increase from 6,250 AFY during 2005 to 27,100 AFY in the near future.

Other Groundwater

No significant changes are forecasted for the average amount of water supply production from other groundwater basins that are used to meet demands within IEUA's service area. On average, about 33,000 acre-feet per year is projected to be pumped from these outside basins between 2005 and 2025. This is a conservative estimate, consistent with historic production levels. Table 3-11 presents this projected use of other groundwater by agency.

Table 3-11
Projected Other Basin Groundwater Supply in IEUA Service Area (AFY)

Agency	Fiscal Year Ending June 30					
	2000[a]	2005[b]	2010	2015	2020	2025
Chino, City of	0	0	0	0	0	0
Chino Hills, City of	0	0	0	0	0	0
Cucamonga Valley Water District	12,800	5,400	5,400	5,400	5,400	5,400
Fontana Water Company	18,985	17,900	17,900	17,900	17,900	17,900
Monte Vista Water District	0	0	0	0	0	0
Ontario, City of	0	0	0	0	0	0
San Antonio Water Company	9,428	6,400	6,400	6,500	6,500	6,500
Upland, City of	17,406	3,100	3,100	3,800	3,900	3,900
Total [c]	**58,600**	**32,800**	**32,800**	**33,600**	**33,700**	**33,700**

[a] Actual Values [b]Estimated Values based on Wet Year [c]Rounded to nearest hundred

Surface Water

No significant changes are forecasted on the average amount of water production from surface supplies that are used to meet demands within IEUA's service area. The availability of surface water supplies fluctuates greatly with wet and dry years. Retail agencies with access to surface supplies are investing in infrastructure that will improve their ability to capture and use these water sources.

On average, about 18,700 acre-feet annually of surface water is projected to be available between 2005 and 2025 as shown on Table 3-12. This is a conservative estimate, consistent with historic production levels.

Table 3-12
Projected Surface Water Production Supply in IEUA Service Area (AFY)

Agency	Fiscal Year Ending June 30					
	2000[a]	2005[b]	2010	2015	2020	2025
Chino, City of	0	0	0	0	0	0
Chino Hills, City of	0	0	0	0	0	0
Cucamonga Valley Water District	4,862	3,000	3,000	3,000	3,000	3,000
Fontana Water Company	4,180	7,000	7,000	7,000	7,000	7,000
Monte Vista Water District	0	0	0	0	0	0
Ontario, City of	0	0	0	0	0	0
San Antonio Water Company	536	3,500	3,500	3,500	3,500	3,500
Upland, City of	346	5,200	5,200	5,200	5,200	5,200
Total [c]	**9,900**	**18,700**	**18,700**	**18,700**	**18,700**	**18,700**

[a] Actual Values [b]Estimated Values based on Wet Year [c]Rounded to nearest hundred

Recycled Water

The implementation of the planned Regional Recycled Water Program is the second critical element of the integrated water management strategy for meeting future water needs within IEUA's service area.

Water supplied through the IEUA's Regional Recycled Water Program will serve the area's needs for irrigation and industrial process water (direct use) as well as provide

replenishment water for the Chino Groundwater Basin in conjunction with local storm water and imported deliveries. Over 2,000 potential direct use customers have been identified and a distribution pipeline system and related facilities have been designed and are under construction to hook up these customers over the next ten years. In addition, the pipelines will deliver recycled water to more than twenty groundwater recharge basins within IEUA's service area (also see Chapter 5).

The regional distribution facilities will include over fifty separate pipelines, pump stations, and reservoir projects. The phased construction of these facilities is projected to cost $200 million and is scheduled to be well underway by 2015. The Regional Recycled Water Program is planned to deliver a total of 74,000 acre-feet of new water supplies for both direct and replenishment within ten years. An aggressive marketing program is underway to make the recycled water available to the customers.

Beyond 2015, an additional 50,000 acre-feet annually of high quality recycled water will be available through IEUA's treatment plants as a result of expected population growth within its service area. This represents a new potential alternative water supply that will be available within 15-20 years and beyond (see Chapter 7).

The amount of recycled water that is projected to meet future water needs within IEUA's service area is based upon the completion of the currently planned facilities. Of the 74,000 acre-feet that will be distributed by 2015, 49,000 acre-feet annually will be for direct use (irrigation, industrial processing) and 25,000 acre-feet annually will be for groundwater replenishment. The projected recycled water supply by agency is shown in Table 3-13 along with the total available recycled water.

Table 3-13
Projected Recycled Water Production in IEUA Service Area (AFY)

	Fiscal Year Ending June 30					
Agency	**2000[a]**	**2005[b]**	**2010**	**2015**	**2020**	**2025**
Chino, City of	368	3,400	4,600	6,300	8,900	8,900
Chino Hills, City of	129	800	2,900	4,000	4,000	4,000
Cucamonga Valley Water District	0	1,270	10,250	15,900	19,200	21,600
Fontana Water Company	0	0	2,600	3,400	4,000	4,300
Monte Vista Water District	0	0	400	500	700	700
Ontario, City of	1,073	1,800	7,900	8,800	11,800	12,400
San Antonio Water Company	0	0	0	0	0	0
Upland, City of	0	0	0	0	0	0
Subtotal	**1,570**	**7,270**	**28,650**	**38,900**	**48,600**	**51,900**
IEUA	3,090	130	5,175	5,050	4,700	8,550
Total Recycled Water Direct Use	**4,700**	**7,400**	**33,800**	**44,000**	**53,300**	**60,500**
Future Recycled Water Supply[d]						
Direct Use	4,700	7,400	39,000	49,000	58,000	69,000
Groundwater Replenishment (IEUA)		1,000	22,000	25,000	28,000	35,000
Total Recycled Water Use[c]	**4,700**	**8,400**	**61,000**	**74,000**	**86,000**	**104,000**

[a] Actual Values

[b] Estimated Values based on Wet Year

[c] Rounded to nearest hundred

[d] Based on IEUA Recycled Water Implementation Plan

Source: Retail Agency's UWMPs

3.6 FUTURE IMPORTED WATER SUPPLIES

Increasing conflicts over the quantity and quality of the imported water from the State Water Project (SWP) and Colorado River Aqueduct (CRA) have increased the costs of these supplemental supplies in Southern California as well reduced their potential reliability.

MWD evaluated the dependability of these supplies in and concluded that imported water would be available to ensure the continued delivery of the historic average imported water amounts of 1.2 million acre feet annually (CRA) and 700,000 acre-feet annually (SWP)[5]. IEUA expressly relies upon MWD's Draft UWMP in estimating future imported water availability to its service area (see Chapter 10).

In April of 1998, Metropolitan's Board of Directors adopted the Water Surplus and Drought Management Plan. The guiding principle of the WSDM Plan is to manage Metropolitan's water resources and management programs to maximize management to wet year supplies and minimize adverse impacts of water shortages to retail customers. From this guiding principle come the following supporting principles:

- Encourage efficient water use and economical local resource programs
- Coordinate operations with member agencies to make as much surplus water as possible available for use in dry years
- Pursue innovative transfer and banking programs to secure more imported water for use in dry years.
- Increase public awareness about water supply issues.

As a result of the integrated water management strategy being implemented within IEUA's service area, the amount of firm full service imported water needed to meet the area's expected water demands over the next twenty years is expected to increase from 60,200 to about 82,500 AFY as presented in Table 3-14. Even with the expected growth in the area's average annual water supply (163,000 acre feet without conservation over the next twenty years), these new water supplies are planned to be met primarily through locally developed water supplies. Full service imported water purchases are expected to remain within MWD's lower cost Tier I fee schedule for most current users of these supplies.

[5] MWD Draft Urban Water Management Plan, September 2005

Table 3-14
Projected Imported Water Supply in IEUA Service Area (AFY)

Agency	Fiscal Year Ending June 30					
	2000[a]	2005[b]	2010	2015	2020	2025
Chino, City of	5,195	4,300	5,400	5,400	5,400	5,400
Chino Hills, City of	12,940	400	1,900	2,400	2,800	3,300
Cucamonga Valley Water District	26,920	28,000	29,000	29,000	29,000	29,000
Fontana Water Company	0	0	2,300	6,500	11,600	13,000
Monte Vista Water District	3,298	6,300	6,800	6,800	7,600	7,500
Ontario, City of	8,824	16,900	19,100	19,900	19,900	20,000
San Antonio Water Company	0	0	0	0	0	0
Upland, City of	3,717	4,300	4,300	4,300	4,300	4,300
Total [c]	**60,900**	**60,200**	**68,800**	**74,300**	**80,600**	**82,500**

[a] Actual Values [b]Estimated Values based on Wet Year [c]Rounded to nearest hundred

3.7 FUTURE WATER SUPPLIES SUMMARY

Through the implementation of the integrated water management strategy within IEUA's service area, available water supplies will exceed anticipated demand. Projected water supply mix needed to meet urban water use by source within the IEUA service area is shown in Figure 3-7. The projected water use by agency is presented in Table 3-15.

Figure 3-7 Projected Water Supply

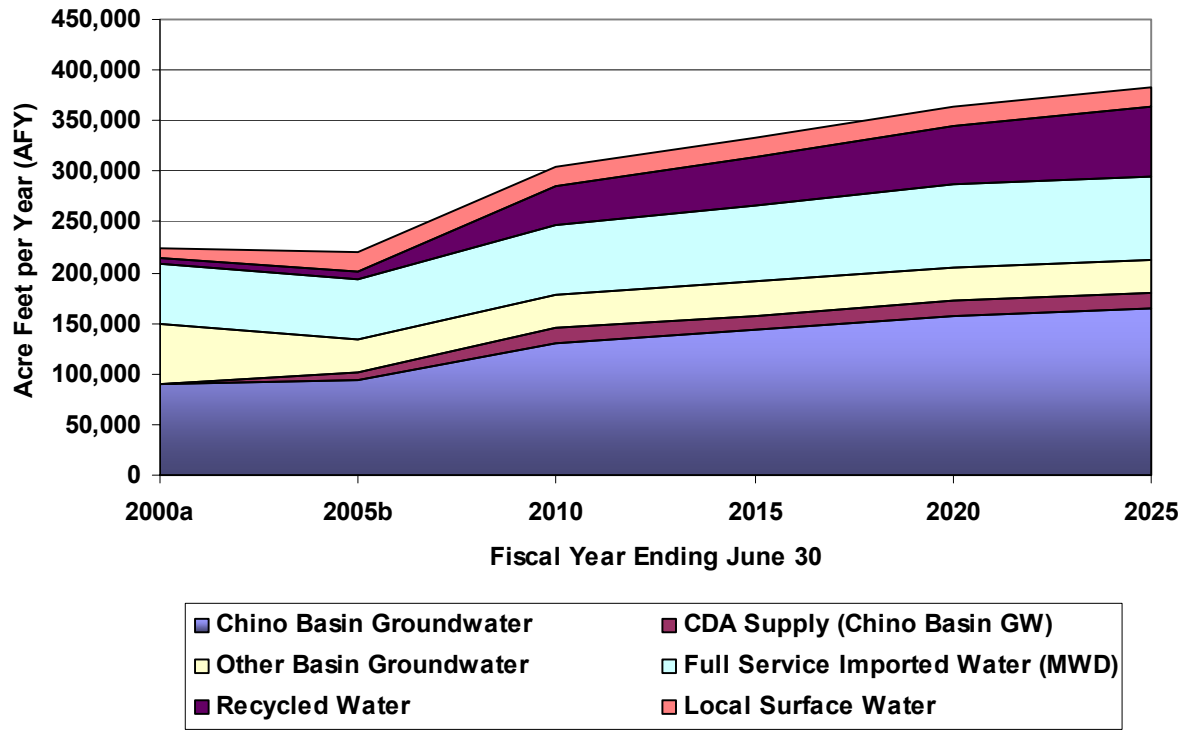


Table 3-15
Projected Urban Water Supply by Agency (AFY)

Agency	Fiscal Year Ending June 30					
	2000[a]	2005[b]	2010	2015	2020	2025
Chino, City of	15,764	19,000	23,900	28,800	32,500	32,500
Chino Hills, City of	17,333	16,750	22,700	24,700	25,400	26,400
Cucamonga Valley Water District	51,831	51,500	75,650	87,300	93,600	96,000
Fontana Water Company	44,317	49,400	54,800	59,800	65,500	67,200
Monte Vista Water District	11,924	12,500	27,800	27,500	31,100	30,500
Ontario, City of	46,420	43,000	61,300	66,600	76,700	84,400
San Antonio Water Company	10,257	4,135	4,235	4,335	4,435	4,535
Upland, City of	23,038	23,600	23,600	24,300	24,400	24,400
Excess Recycled Water Supply	3,090	260	10,350	10,100	9,400	17,100
Total	**224,000**	**220,100**	**304,300**	**333,400**	**363,000**	**383,000**

[a] Actual Values [b]Estimated Values based on Wet Year [C]Rounded to nearest hundred